Musculoskeletal examination in rheumatology

Symptoms, clinical examination

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Rheumatology

- Subspecialty of internal medicine focused on diseases of joints, muscles, bones
- Musculoskeletal complaints are among the most common symptoms

More than 200 different rheumatic diseases

- Inflammatory rheumatic diseases
- Degenerative rheumatic diseases
- Extraarticular rheumatic diseases
- Reactive arthritis
- Systemic diseases
- Metabolic bone and joints diseases

Different treatment, different prognosis

Musculoskeletal examination

Musculoskeletal conditions should always be part of any general history and examination.

Once an abnormality has been identified, a more detailed assessment is necessary.

Diagnosis in rheumatology

- The diagnosis in rheumatology is mainly based on:
  - Detailed medical history
  - Physical examination including the arthrological

- Imaging and laboratory tests are auxiliary methods
  - It is necessary to know their sensitivity and specificity for the specific diagnosis and therefore right interpretation of these results is important

A rheumatologist must also cooperate with doctors of other specialties.

History

First clarify what has brought the patient to the consultation.

What the patient’s expectations are:

<table>
<thead>
<tr>
<th>Patient expectation</th>
<th>Clinician expectation</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is wrong?</td>
<td>Is any abnormality present?</td>
</tr>
<tr>
<td>What will happen?</td>
<td>Are you doing the right thing?</td>
</tr>
<tr>
<td>Will I get better?</td>
<td>Should I continue doing this?</td>
</tr>
<tr>
<td>Will I become more able to do what I want and need to do?</td>
<td></td>
</tr>
</tbody>
</table>
### Musculoskeletal complaints

- **evaluating of patients:**
  - establish the cause
  - to characterize the problem and its impact
  - develop a management plan

If unable to identify the cause, physicians must at least be able to describe the abnormality and recognize whether it need more skilled assessment.

The physician must be able to assess response to treatment and be able to recognize the lack of expected response.

### Medical history – what is important

- Several diseases are associated with musculoskeletal manifestations
- Some diseases can modify the course of rheumatic disease
- Some diseases may represent potential risk factor for the treatment of rheumatic disease
- Exclude other diseases - infectious foci, diarrhea, urinary infection, tonsillitis, malignant diseases (paraneoplastic sy.)

### Drugs history

- Adverse reactions on musculoskeletal system
- Mask or modify the course of rheumatic disease
- Induce rheumatic diseases
- Drug interactions after treatment initiation

### Medical history – what is important

- Family history: there is a typical genetic predisposition for lots of rheumatic diseases, some of the genes are associated with higher risk of autoimmune diseases generally
- What do we ask for?
  - occurrence of rheumatoid arthritis, psoriatic arthritis, psoriasis, inflammatory bowel diseases, antigen HLA B27, systemic diseases of connective tissue, osteoporosis

### Gynaecologic history

- Recurrent abortions (by some systemic diseases like SLE).
- Premature menopause (risk of osteoporosis)
- Climacteric sy.
Origin and localisation of the referred pain

- Lumbar region - Retroperitoneum
- Right shoulder – bile ducts
- Left shoulder - heart, spleen
- Hip and inguinal region (groin) - urinary tract
- Sacral area - genitals
- Chest wall - pleura
- Back and sternum - esophagus, aortic aneurysm

Pain localisation

- Periarticular - the patient can often point the finger exactly on the location of the pain, the pain occurs only with certain movements when irritation of the affected site

- Articular - patient shows a hand on the entire joint, typically worsens during movement (active and passive)

- Muscles - the patient shows across the muscle, there might be cramps, feeling of muscle weakness
What are characteristics pattern of the pain?

Certain musculoskeletal conditions are characterized by specific patterns of pain.

The features of the pain:
- the time and mode of onset
- its diurnal pattern provide diagnostic clues
- Severity of the pain is subjective and not diagnostic alone

For example, gout usually begins in the middle of the night with a pricking sensation in the great toe and quickly escalates into an intolerable persistent burning pain.

Osteoarthritis is characterized by use-related pain and stiffness of the affected joints with inactivity.

Mechanical pain is generally related to use.

Inflammatory joint pain is present at rest and with use and is usually worse.

What precipitates, worsens, or improves the pain?

Periarticular problems are often induced by a specific type of repetitive activity.

Spinal stenosis can be suspected from a history of activity-related buttock and leg pain that improves rapidly with rest only to recur after further activity.

The response to exercise in contrast to rest is a typical feature of sacroiliitis or spondylitis.

Rest usually improves the pain from osteoarthritis but has little effect on inflammatory pain.

The response to NSAID versus simple analgesics can help distinguish an inflammatory cause of the symptoms, such as ankylosing spondylitis, from mechanical back pain.

The effect of treatment

- NSA – inflammatory pain responds well
- Common analgetics – inflammatory pain will not respond but mechanical will
- CS – inflammatory pain and pain by polymyalgia rheumatic responds well
- Colchicine – pain by gout flare (but also by treatment with NSA in full doses)

Response to treatment

- heat vs cold in arthritis vs arthralgias
- ATB vs corticosteroids in systemic diseases

Examination in rheumatology
**SWELLING**

What is important

- Whether it comes suddenly or gradually
- Whether it is associated with pain and limited function
- Whether there is a temperature and skin colour change

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**Rheumatoid Arthritis: PIP Swelling**

Swelling is confined to the area of the joint capsule

Synovial thickening feels like a firm sponge

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**BOX 28.3 CLINICAL SIGNS OF MUSCULOSKELETAL CONDITIONS**

- Atitude
- Deformity
- Swelling
- Skin changes
- Muscle wasting
- Tenderness
- Restricted movement
- Crepitation
- Warmth
- Muscle weakness
- Instability
- Limited function

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**Characteristic pattern of involvement of the musculoskeletal system**

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Symmetry</th>
<th>No. of joints involved</th>
<th>Large or Small</th>
<th>Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rheumatoid arthritis</td>
<td>Symmetric</td>
<td>Polyarthrits</td>
<td>Large</td>
<td>Peripheral</td>
</tr>
<tr>
<td>Arthritis ankylosis</td>
<td>Asymmetric</td>
<td>Oligoarthrits</td>
<td>Small</td>
<td>Central and peripheral</td>
</tr>
<tr>
<td>Posthumic arthritis</td>
<td>Asymmetric</td>
<td>Oligoarthrits</td>
<td>Large</td>
<td>Peripheral</td>
</tr>
<tr>
<td>Reactive arthritis</td>
<td>Asymmetric</td>
<td>Oligoarthrits</td>
<td>Large</td>
<td>Peripheral</td>
</tr>
<tr>
<td>Gout</td>
<td>Asymmetric</td>
<td>Oligoarthrits</td>
<td>Large</td>
<td>Peripheral</td>
</tr>
</tbody>
</table>

*With oligoarthrits, few or many joints are affected, with polyarthrits more than the joint are affected.
Osteoarthritis

Distribution of Primary OA

OA - Distal and Proximal Interphalangeal Joints involv.

Stiffness

- Typical symptom for inflammatory diseases
- The duration of stiffness corresponds with disease activity
- By active RA lasts for more than an hour
- By osteoarthritis there are so called starting problems - short-term pain and stiffness (a few minutes) at the beginning of the movement with quick disappearance
- Rigidity in Parkinson's disease and other neurological diseases persists after motion

Hand and wrist deformities

- Ulnar deviation
- Buttonhole deformity
- Swan neck deformity
Weakness

- Muscle weakness
  - myopathy and myositis - patients often describe it as the inability to perform certain tasks such as to comb the hair, lift things off the shelf above the head or sit up from a chair without helping hands
  - atrophy of muscles on the affected joints and movement restrictions
  - manifestation of neuropathy
General symptoms

- Tiredness – demonstration of activity of inflammatory disease or anaemia, drugs AE
- Subfebrilities - with active rheumatoid arthritis or systemic CTDs
- Febrile - systemic diseases (SLE or vasculitis)
- Sleep disorders or mood disorders, anxiety
- Necessary to rule out other causes of the difficulties - malignancies, the effect of drugs, infections

Inspection

- Changes in the mucous membranes, nails, fingertips (ulcers by systemic diseases - scleroderma, vasculitis)
- Gouty tophi, calcifications, rheumatic nodules
- Skin - psoriasis, rash typical for systemic diseases and vasculitis, erythema sweet wrapper in SLE, changes typical for myositis (Gottron papules, heliotropic rash, periorbital oedema, hand drive), skin changes in SCL
- Raynaud's phenomena

Nails

- Clubbing - hypertrophic pulmonary osteoarthropathy, fibrosing alveolitis
- Onycholysis and dystrophic changes - psoriatic arthropathy, chronic Reiter's syndrome
- Hyperaemia of nail bed - dermatomyositis
- Haemorrhages under nails - vasculitis of small vessels
- Reiter syndrome

Psoriasis

Vaskultis

Kalcifications, reumatic nodules

Digital ulcerations
SLE

Polymyositis (DM/PM)

Gottron papulæ

Heliotrope Rash

SSc
Systemic sclerosis

Raynaud Phenomenon

5 Causes for Raynaud’s Disease or Raynaud’s Phenomenon
1. Disease of the arteries (atherosclerosis)
2. Drugs that cause narrowing of the arteries (angiotensin-converting enzyme inhibitors, non-steroidal anti-inflammatory drugs, some steroids, etc.)
3. Certain autoimmune conditions (e.g., lupus, scleroderma, rheumatoid arthritis)
4. Smoking
5. Repetitive hand jobs, sucking (e.g., typing, knitting)

SSc

Gout
Palpation

- Examination of the typical symptoms of arthritis - swelling and palpable sensitivity
- Symptom of buckling - the presence of articular effusion cavity = compression of one part filled with liquid causes bowing in another part
- Hypertrophy of the synovial lining (normal is not palpable)
- Pain on passive movement - sign of inflammation
- Changes in skin temperature
- Crepitation - fine by hypertrophy of the synovium in arthritis - gross by degenerative changes

Symptoms typical for synovitis

- Holding the joint in a neutral position
- Restriction of movement in all direction
- Pain when moving in any direction
- Swelling / effusion of the joint capsule (the most specific symptom)
- Increase of the skin temperature over the joint
Examination of the hand and wrist

- The normal range of motion
  - Radial flexion 20-30°
  - Ulnar flexion 50°
  - Palmar flexion of the wrist 80-90°
  - Extension of the wrist 70-80°
  - Flexion in PIP 20-30°
- Palpation - Arthritis diff.dg. arthrosis

Characteristic symptoms of hypermobility

- Extension of 5th finger over 90° (1 point for each side)
- Adduction of the thumb to the forearm (1 point for each side)
- The extension of the elbow more than 10° (1 point for each side)
- Extension of the knee more than 10° (1 point for each side)
- Touch the floor a flat of the hands when legs are outstretched (1 point)
  - The maximum score 9
  - Hypermobility 6 and more

Examination of elbow

- Joints – humeroulnar (flexion, extension), humeroradial and proximal radioulnar (pronation, supination) - joint articular capsule
- The elbow joint effusion – palpation when gentle flexion of the elbow between the lateral epicondyle and the olecranon
- Bursitis olecrani
- Palpable sensitivity epicondyle
  - Radial epicondyritis - tennis elbow
  - Ulnar epicondyritis - golf elbow

Examination of shoulder

- Sternoclavicular joint
- Acromioclavicular joint
- Glenohumeral joint
- Tendons of rotator cuff - m.supraspinatus, m.infraspinatus, m.teres minor
- Muscles and ligg
Examination of shoulder

- Indicative assessment of the glenohumeral joint and rotator cuff - no more severe pathology if the patient is capable of following movements
- Abduction of shoulders and closure of hands on the neck
  - Abduction, external rotation, flexion GH joint, m.supraspinatus, m.infraspinatus, m.teres minor
- Placing hands on the dorsal side of the back (at the cross)
  - Internal rotation, abduction, extension GH joint, m.subscapularis

Pain and limitation of active and passive movements of the arm - Pathology GH articulation

- Passive movements are clearly more extensive and less painful - probably affected muscle / tendon (or nerve)
- Active movements against resistance (Abduction, internal and external rotation)

Palpation of rotator cuff - palpation for and behind acromium

- The patient puts his hand on the contralateral arm from the front of the chest
- In a similar way, the patient puts his hand behind the back

Painful middle arc (impingement)

- In about 30º of the whole movement - typical for lesion of m. supraspinatus and subacromial bursitis

Painful upper arc

- last 20-30º - typical for lesion of acromioclavicular joint

Examination of the spine

Lumbar spine

- Look for a normal lordosis or any scoliosis. Look for any asymmetry
- Feel: Percuss the vertebrae for tenderness.
- Palpate the paraspinal muscles for spasm or tenderness.

Functional metric tests: Thomayer’s distance, Stibor’s, Schober’s, Otto’s distance, distance napo-wall (measurement of chest excursions)

- Stress Tests for tension of the lumbar roots
  - Femoral nerve stretch test
  - Scolic nerve stretch test
  - Laserque test: the patient lies on his back, he slowly raises the stretched leg to about 70º
    - 0-40º there is no tension on the nerve root, but the siscadicus is stretched
    - 40-70º there is a tension of roots L5, S1 and S2
    - > 70º there is no distortion of roots
Spondylitis ankylosans

Examination of sacroiliac joint

- SI articulation are not available for inspection
- Basis - palpation and tests
- Inflammatory back pain (4/5 of symptoms)
  - Age <40 years
  - duration of the pain > 3 months
  - slow start
  - morning stiffness
  - Improvement after movement

Examination of sacroiliac joint

Menellov’s tests

Leg hyperextension when lying on the stomach or the pressure on the iliac crest when lying on the side causes pain

Inflammatory Back Pain (IBP) According to Various Criteria

- IBP if 4 / 5 are present.
- IBP if 2 / 4 are present.
- IBP if 4 / 5 are present.

Colin et al., 1
Rubenkov et al., 2
IBP experts (ASAS), 3

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Examination of spine– normal values of distances

- Stibor > 6 cm
- Schober > 4 cm
- Thomayer < 10 cm
- Chest expansions > 5 cm
- Nape-wall 0 cm

Course of AS

Examination of the spine

Cervical spine
- Look for hyperextension caused by thoracic kyphosis or loss of normal lordosis.
- Feel the paraspinal muscles for tenderness.
- Palpate the paraspinal muscles for spasm or tenderness.
- Move actively turn the head to the flexion, extension, rotation and lateral flexion with the gently guiding the head to ensure that maximum range is reached.
- Tests Problems related to the cervical spine are often associated with neurologic symptoms and signs,
**Examination of hip**

- Abduction 45º
- Adduction 30º
- Internal and external rotation 45º
- Extension 15º
- Flexion 120º

**Examination of hip**

- Pain in hip – in inguinal region
  - It can radiate to the anterior and lateral aspect of the thigh, gluteal region, anterior side of the knee
- Pain in the hip - deep in the gluteal region
  - It can variably radiate along the ventral side of the thigh
- Bursitis - in the greater trochanter - localized and palpable sensitivity of a given site
  - Occasionally, it may radiate along the outside of the thigh
- Enthesopathy trochanter. Bursitis - it is aggravated by gait and pressure

**Examination of knee**

- Pain
- Swelling
- Warmness
- Colour
- Motion restriction
- Tendon contractions
- Deformities

**Examination of knee**

- Anterior drawer test
- Lachman test
- Pivot test
- Valgus stress test
- Varus stress test
Rheumatologic patient
systemic connective tissue disease

- Typical patient hospitalised at Internal medicine dpt. with FUO, fatigue, malaise, weakness, artralgia myalgia ....
- increase CRP and FW levels, anemia
- difficulties in diff. Dg.
- cooperation with other internal medicine subspecialties orthopaedics, neurology, gastroenterology, dermatology, ophthalmology, infectology, haematology, psychiatry ....

Laboratory tests in rheumatology

- Confirm/exclude diagnosis
- Monitor the disease activity and response to our treatment
- Assessment of disease prognosis
- Assessment of disease or treatment complications

Inflammatory markers
Acute phase reactant

- CRP, FW, protein ELFO
  sensitive but not specific
  positive in other diseases
  - infections, malignancy, CKD, DM, anemia ....

Confirm/exclude diagnosis

To know the sensitivity and the specificity

Rheumatoid factor (70% in RA) less than 5% in healthy people
Anti CCP in RA
muscle enzymes in PM
ANA, ANCA, DsDNA, complement in SLE, vasculitides
HLA B 27 in AS
Serology antibodies detection in reactive arthritides dif.dg.
  (borelia, chlamydia, mykoplazma, EBV, CMV ....)
ASO (febris rheumatica)
Uric acid (gout)

Immunological methods

- Autoantibodies (RF, tissue-specific / non-specific)
- circulating immune-complexes
- immunoglobulin levels
- Complement and its components
- phagocytic activity
- Subpopulations of T-cells
- Lymphocyte function tests
- Immunohistology (deposits of immunoglobulins)
- Immunogenetics - HLA B27

Microbiologic methods

- Direct evidence - culture tests, PCR, direct immunofluorescence
- Serological examinations - antibodies against viruses, bacterias, fungi
Extraarticular involvement in rheumatology

Confirm/exclude organ involvement in systemic diseases
- Kidney (urin examination - protein, blood ...
  blood examin. - glomerular filtration, creatinin, urea,...)
- Lung (spirometry, x-Ray, HR CT)
- Heart (pericarditis, valve disorders, pulmonary hypertension)
- Brain (MRI – vasculitis)
- Eyes (uvelitis, sicca sy)
- Liver (hepataline enzýmy, albumín, koagulačné faktory)
- Biopsy

Imagining methods
- USG, RTG, CT, MRI, ECHOkg., PET/CT..
- Sensitivity and specificity – coincidence of several diseases
- Capilaroscopy of nail bed

Conclusion

For the right understanding of rheumatology as well as the proper management of these diseases it is necessary to have good knowledge from internal medicine and enough time.